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Johnstown and York: A Comparative Study of Two Industrial Cities

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In addition to its large cities, northeastern United States contains many smaller urban centers, ranging in population from fifty thousand to one hundred thousand or more, which are dominantly industrial in function. Many of these small industrial cities resemble one another in their fundamental aspects, but others present interesting contrasts. Of this latter character are Johnstown and York, two Pennsylvania cities¹ (Figure 1).

¹ For more detailed accounts of the geography of these two cities see the writer's "The Geography of Johnstown, Pennsylvania—an Industrial Center," The Pennsylvania State College, Mineral Industries Experiment Station *Bulletin No. 13*, 1934; and "The Economic Geography of York, Pennsylvania—a City of Diversified Industries," issued in 1935 as *Bulletin No. 17 of the same series*.

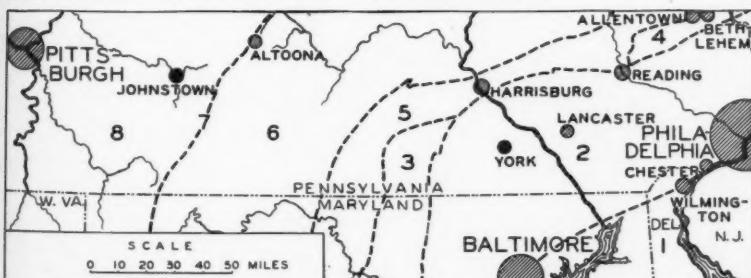


FIG. 1.—The regional setting of Johnstown and York. Only the larger urban centers are shown, their circle areas being approximately proportional to population. The numbers refer to the following geomorphic provinces: 1, Coastal Plain; 2, Piedmont Province; 3, South Mountain extension of Blue Ridge Province; 4, Reading Prong of New England Upland; 5, Great Valley; 6, Appalachian Ridge and Valley Region; 7, Allegheny Front; 8, Appalachian Plateau.

The former with a population of 100,000 is in the Appalachian Plateau and has much in common with Pittsburgh; the latter, 120 miles farther east and with a population of 70,000, faces toward Philadelphia and Baltimore.² It is proposed here to present some of the major facts of the geography of Johnstown and York by means of comparison and contrast.

LOCATIONAL ASPECTS

One hundred and twenty miles is not a great distance; and many cities lying that close together are essentially neighbors, with the common interests which the word implies. But the particular one hundred and twenty miles which separate Johnstown and York are more than commonly critical, and the locational differences of the two cities are out of all proportion to mere distance.

Johnstown is in the Appalachian Plateau only 60 miles from Pittsburgh, and is in a valley that leads west to Pittsburgh. East of it lies the abrupt eastern edge of the Plateau, and east of that the folded mountains of central Pennsylvania, the two together constituting a region of relatively sparse population which separates Johnstown from the lower lands fringing the eastern seaboard. Thus both a topographic divide, with its attendant transportation difficulties, and a population divide encourage Johnstown to face westward.

York is encouraged by this same topographic and population divide to face eastward. Lying in the Pennsylvania Piedmont, it is at the western edge of the populous eastern seaboard country. Both for marketing in this great population area and for ocean trade York has a far better location than Johnstown.

But there are still other reasons for the two cities facing in opposite directions. The Appalachian Plateau in which Johnstown is situated is a region of indifferent agricultural quality but of widespread bituminous coal resources. It is much like Pittsburgh and like Pittsburgh must reach west for iron ore for its major manufacturing industry, while the two cities have a common interest in the mining and marketing of coal. York and its vicinity lack any great fuel resource, but can balance against this deficiency the better agricultural quality of southeastern Pennsylvania. Being just at the western edge of a great market area, a market both for its manufactured products and for the end products of agriculture, and lying not far from Atlantic ports in the same direction the city has come naturally to look eastward.

² The names Johnstown and York, as used in this article, refer in each case to the geographic city, or the entire region of uninterrupted urban development, and not merely to the political city.



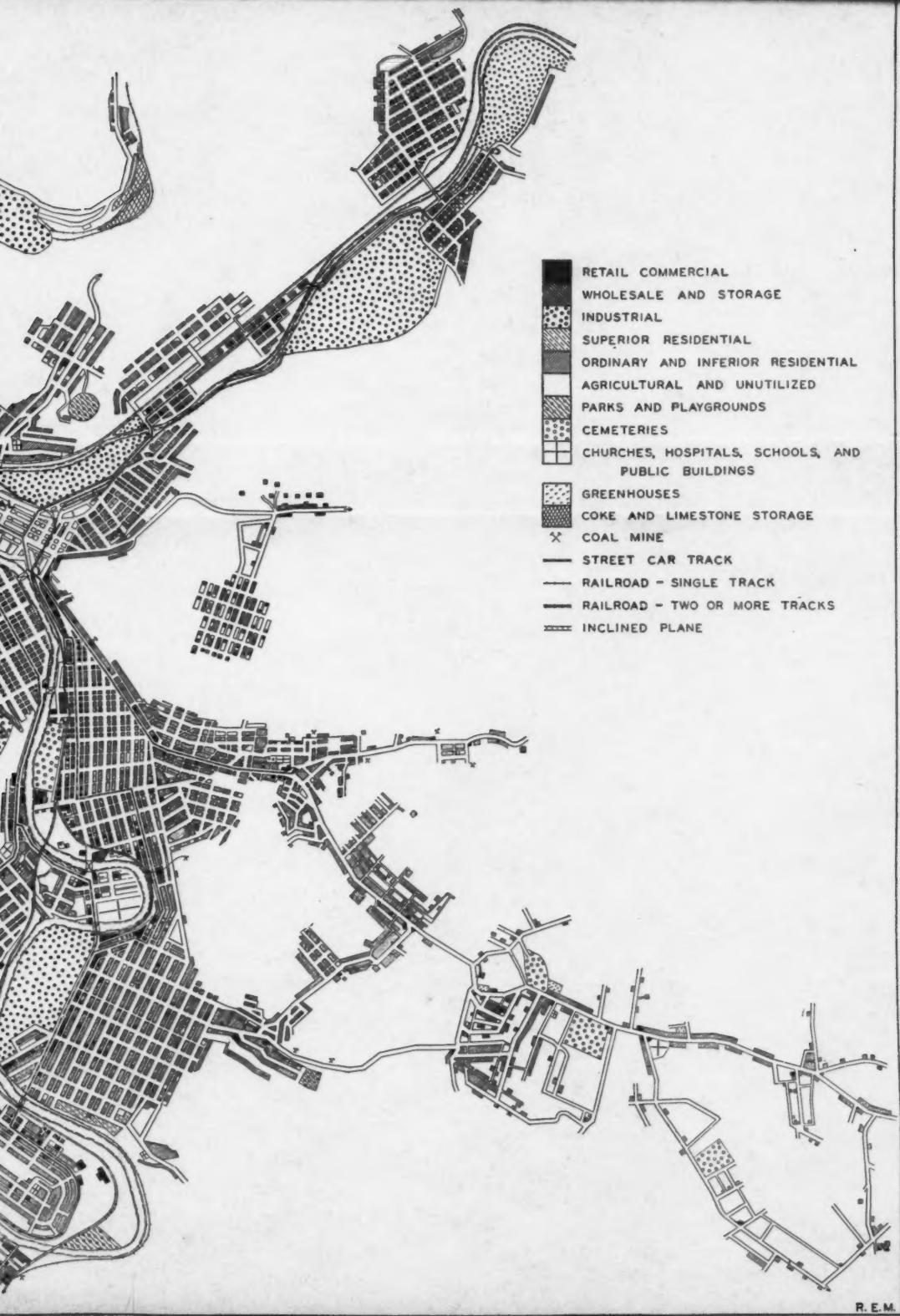


GREATER JOHNSTOWN — 1932





FIG. 2.—Land use in Johnstown, 1932. (For



1932. (For details of commercial core see Figure 14.)

R. E. M.





FIG. 3.—Looking northward at Johnstown from the air. (Photograph by Frank Turgeon, Jr.)

RELATIONS TO TOPOGRAPHY

The structural characteristics of both Johnstown and York show the restricting effect of topographic conditions, but Johnstown shows this influence to a much more marked degree (Figures 2 and 3).

Johnstown is predominantly a river valley city. At the heart of the city, Stony Creek flowing from the south meets the Little Conemaugh River which flows from the east, the combined stream, the Conemaugh, taking a northwestward course. The floors of the valleys of these streams lie 500 to 600 feet beneath the general plateau level, separated from it by abrupt valley sides; and the small areas of flat land strung out along the valley bottoms, together with the somewhat larger flat where the rivers join, form the site for most of the city. As a result the urban picture has a primary pattern of three prongs or spokes radiating from a central point, the stream junction; the prongs widening where the valley bottom widens and narrowing where it narrows. The steep valley sides have prevented the normal outward expansion of Johnstown from the valley floors. So restricted has the city been by these valley walls, that the lowland sections are extremely crowded, and inordinate elongation along the valley floor has enhanced the three-prong effect.

Further in response to topography, the steep valley sides have in most places been left unused while a second level of the city has developed on the plateau surface above, connected in only a few favorable spots with the Johnstown of the valley floors. It is this irregular, second-level growth that complicates the present-day picture of Johnstown, giving several extensions of plateau-surface urban development to add to the three prongs of city already described; and as a result the city in plan view has a much more sprawling appearance than it otherwise would have. Between the upland and lowland areas, gaps of forested or bare slopes have been left unutilized, entirely surrounded by city development.

Much simpler is the structure of York (Figure 4). There a level-floored, northeast-southwest trending, limestone lowland, locally made basin-like by the erosional effect of a stream which diagonals across it from south to north, has furnished the city site. With abundant flat land available in a northeast-southwest strip, the city has developed the shape of an elongated ellipse. Even the relatively steep slopes of the southern rim of the lowland have retarded the city's growth but little, and there have been no relief obstacles to be left as nunataks in the flow of urban development. Consequently, York is more regular in shape than Johnstown; and, paradoxically, because it has more space and is less confined by nature it is more compact.

Several other factors contribute to the compressed character of the city.

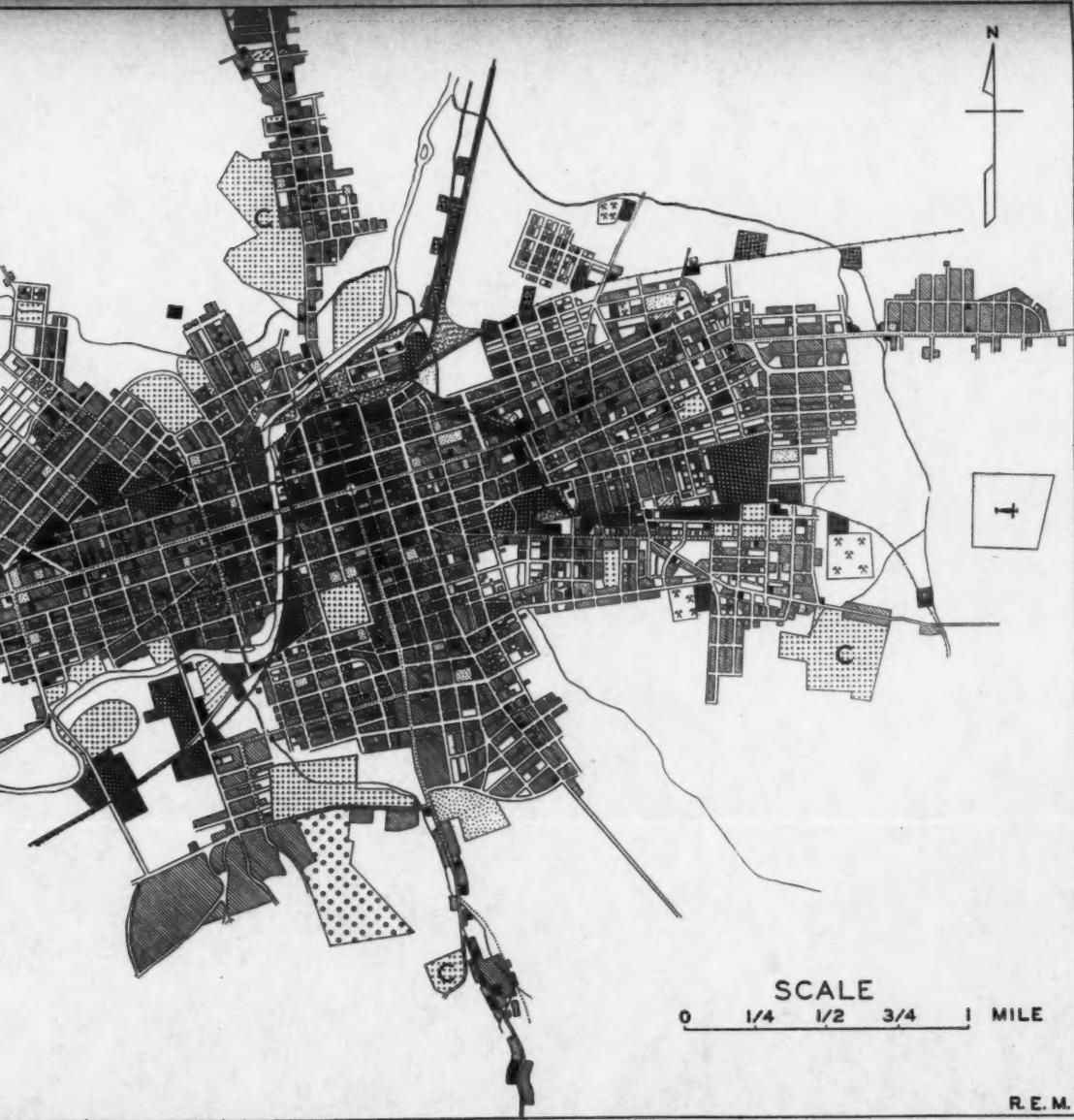


YORK IN 1934

COMMERCIAL
INDUSTRIAL
RESIDENTIAL
TRANSPORTATIONAL
STORAGE
PUBLIC BUILDINGS AND GROUNDS
PARKS, CEMETERIES, AND PLAYGROUNDS
YORK WATER COMPANY PROPERTY
FAIRGROUNDS
FLYING FIELD
GREENHOUSES AND NURSERIES
QUARRY OR PIT
AGRICULTURAL AND VACANT
RAILROAD - SINGLE TRACK
RAILROAD - TWO OR MORE TRACKS
STREET RAILWAY
RAILROAD STATION



FIG. 4.—Land use in York, 1934. On app



34. On approximately the same scale as the map of land use in Johnstown (Figure 2).

R.E.M.



The dominant house type of York, which will be discussed at greater length later, is economical of space; and, moreover, the city's industries are not such great space users as is Johnstown's primary iron and steel manufacture. It is not surprising, therefore, to find that the total area of York is only about half that of the plateau city.

As might be expected, street patterns show far more diversity in Johnstown than in York. The major part of Johnstown occupies valley floors, and the streets of these valley-floor sections conform to local stream trends (Figure 5). An interesting characteristic of the streams which play such



FIG. 5.—Ferndale, a borough in the southern part of geographic Johnstown, showing striking conformance of street pattern to stream trends. (Photograph by Frank Turgeon, Jr.)

an important part in the Johnstown site is that they have entrenched meandering courses; and each minor section of the city seems to have arrived at a street pattern in which its major streets parallel the stream at that particular place but do not parallel the streets of adjoining parts of the city. Though a right-angled pattern is dominant, there is no consistent trend, either on the valley floor or on the upland. Instead, there is every evidence of the city having grown up as a great many minor, semi-independent centers, each developing its own street pattern, and usually conforming to local topographic conditions. But even if the city's street pattern were being planned anew there would of necessity be much variation in the trends

of the major streets of various sections because of the winding courses of the streams and their valleys.

York's street pattern is by contrast extremely simple (Figures 4 and 6). The city's streets trend dominantly northeast-southwest with the course of



Fig. 6.—Air view of York, looking northeast. (Courtesy of The Gazette & Daily, York, Pa.)

York Valley. The surveyors who planned the original town laid off the streets of the central part in accordance with the checker-board pattern already in use in Philadelphia. Additions have shown more or less independence of this original street trend, but an east-west or a northeast-southwest trend still dominates the city as a whole. York has not had forced upon it any such high degree of irregularity of street pattern as Johnstown's meandering valleys predetermined.

There are, of course, other ways in which the two cities reflect the contrast in their topographic conditions. As may well be expected, railroads entering and leaving Johnstown must do so by way of one of the three valleys; from York, where the topography is less restricting, some five or six different courses have been utilized. The same contrast is shown by the highways. Every highway not following one of the valleys which meet at Johnstown enters the city by an abrupt and dangerous descent from the plateau surface. On the other hand, although York's major highway makes

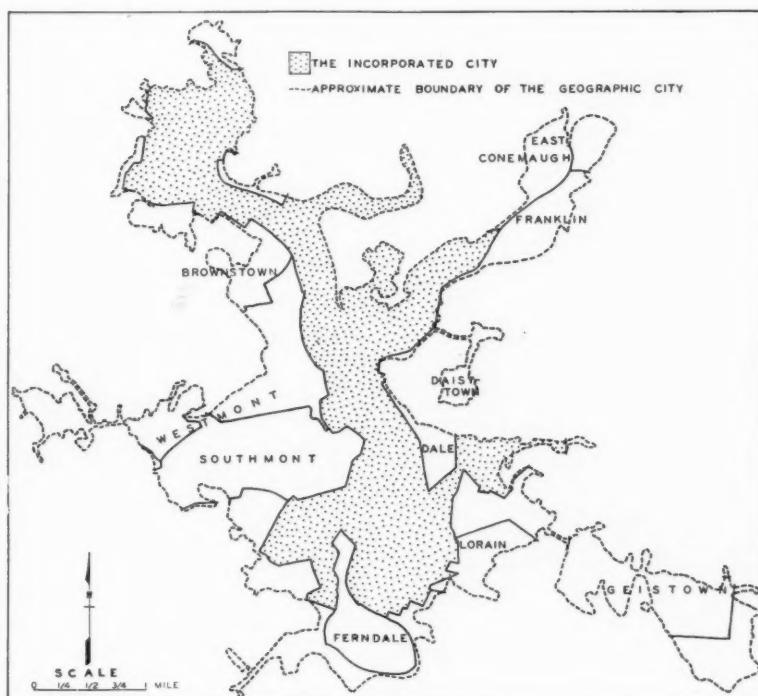


FIG. 7.—The political structure of geographic Johnstown, 1932.

use of York Valley, other roads radiate from the city with little regard for topography and yet do not present difficult grades.

Topographic conditions seem to be partly responsible, too, for the peculiar political structure of Johnstown (Figure 7). Bordering the incorporated city are ten boroughs, separate politically from Johnstown though of necessity cooperating with it to a certain extent. Of course, the existence of so many separate political units is not entirely an adjustment to topographic conditions, but it is strongly significant that four of the boroughs are on the plateau surface, separated from Johnstown by abrupt, forested valley sides, and that several of the others are long distances from the center of the city and separated from it by narrow, tortuous valley-bottom courses. At least it has been physically easy for the boroughs to remain as separate entities, and they seem determined to continue as such.

York has but two such bordering boroughs. There are other suburban sections outside of political York, but these are gradually being taken into the city, and it is only a matter of time until the boroughs, too, will become part of incorporated York.



FIG. 8.—A typical Johnstown manufacturing plant: the Franklin Works of the Bethlehem Steel Company. (Photograph by Frank Turgeon, Jr.)

CONTRASTING INDUSTRIAL CITIES

Both Johnstown and York are predominantly industrial cities, and yet it is as industrial cities that they exhibit their greatest contrasts.

A visitor to Johnstown is likely to see a pall of smoke hanging over the valley junction (Figure 8). It is the city's badge of industrial prosperity, the sign that Johnstown's major industry is flourishing. Yet York when its industries are operating at a maximum flies no such flag (Figure 9).



FIG. 9.—One of York's largest manufacturing plants. Note the absence of smoke, and the way in which the residential areas crowd against the plant from all sides. (Courtesy of York Ice Machinery Corporation, York, Pa.)

Instead, the city is strikingly free from smoke and dirt.

Statistical data for the two cities present another though related anomaly. Johnstown has 10% of its area devoted to manufacturing as compared with 8% for York; yet York has 22% of its population engaged in manufacturing, Johnstown, only 11%. In short, the plateau city's industries occupy more space than those of York but employ considerably fewer workers.

Differences in the types of manufacturing represented in the two cities go far toward explaining these contrasts. Johnstown is dominated by one industry, the manufacture of iron and steel, an industry which is primary in character, requiring bulky raw materials and great quantities of fuel, and giving rise to much smoke and dirt. Dealing as it does with heavy ma-

terials, this industry has large space needs, but it does not employ as many workmen per unit of area occupied as do most secondary manufacturing industries, industries by which previously processed materials are fabricated into their final useful form. Secondary manufacturing industries are represented by a number of smaller plants at Johnstown, but these are dwarfed into insignificance by the great primary iron and steel industry.

York's industries, on the other hand, are dominantly secondary, using much lighter materials than Johnstown's dominant industry, occupying much less space for each dollar of final product value, utilizing much more labor per unit of area occupied, and, since they operate largely on purchased electric power, creating little smoke or dirt.

Probably the most striking contrast in the industrial pictures of the two cities is in the degree of diversification. Johnstown has one concern, the Bethlehem Steel Company, which employs about two-thirds of the city's manufacturing wage earners; and a second, a subsidiary of the United States Steel Corporation, which accounts for 12%; the other 24% being distributed among approximately one hundred much smaller concerns.³ The largest company represented at York, on the other hand, employs only 12% of the city's manufacturing wage earners and the second largest employs 4%, the remaining 84% being accounted for by some 250 other manufacturing concerns.

As is to be expected, there is a similar contrast in the types of industries represented. Metals and metal products industries employ 82% of Johnstown's manufacturing wage earners and occupy well over 90% of the land of the city which is devoted to manufacturing. Food products industries employ an additional 6 or 7% of the manufacturing wage earners; but no other group of industries employs as many as 4%.

In York, though metal products industries lead they employ only one-third of the city's industrial wage earners while occupying about one-half of the industrial area (Figure 10). Textiles and textile products; paper and printing industries; food and kindred products; tobacco products; wood-working industries; clay, glass, and stone-products industries—all are of significance in York's industrial picture.

The greater industrial diversity of York, both as to number of concerns and as to types of industries, is explainable partly on the basis of differences in natural resources and partly by the different histories of the two cities. In its industrial infancy (about 1850) Johnstown's greatest asset was the iron ore that outcropped on the sides of its valleys. Though unfitted for use by modern iron and steel mills, the ore was particularly

³ Employment data used here are based on the Pennsylvania Industrial Directory.

well suited for the making of the iron rails then in demand for the expanding railroads, so it is not surprising that Johnstown developed as an iron and steel center. The Bethlehem Steel Company, which represents primary iron and steel manufacture at Johnstown today, gets its ore from the Lake Superior Region, its limestone from Central Pennsylvania, and part of its coal (the high-volatile portion) from western Pennsylvania. But most of the coal used is local, so Johnstown's major industry is still based to some extent upon local mineral resources.

York lacked important mineral resources, and its development industrially has been due, instead, to a good market location and to unusually favorable labor conditions. Unlike many eastern cities York has less than 3% foreign born in its population, and Southern and Eastern Europeans, so numerous in many industrial cities, are strikingly absent. Instead, the German element which early settled rural southeastern Pennsylvania settled York also, and normal population increase has been sufficient to satisfy most labor needs. Hard-working and thrifty, these people bought homes and were content to live and work in York on very moderate wages. The high agricultural development of the surrounding country undoubtedly helped by keeping down the cost of living, but at any rate an abundance of intelligent labor contented to work for wages somewhat below the country's average has long been one of York's greatest advantages. Possibly, too,

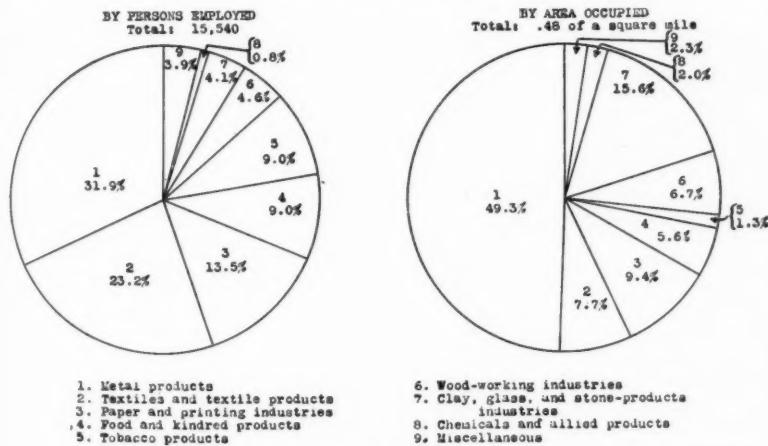


FIG. 10.—A graphical comparison of the various types of industry represented in York, as to persons employed in 1933 and as to areas occupied. (Employment data from Bureau of Statistics, Pennsylvania Department of Internal Affairs; areas calculated from original of Figure 12.)

racial stock or racial traditions must be credited with the inventive skill, the ambition and vision which led to the launching of so many of York's industries, most of which have been started by York people.

A good location, an inexpensive and efficient labor supply, inventive skill, ambition, and vision—these are of value in the development of any line of industry. On the other hand, there were no large local supplies of raw materials at York as at Johnstown to form the basis for specialization, no conditions that favored one industry much more than a number of others. Considering these facts the great diversity of York's industrial picture is not surprising.

Even without its primary iron and steel industry, Johnstown is predominantly a metal products city and in this respect it is similar to York. Metal products include a wide variety of manufactures essential to modern life, and constitute the leading group for Pennsylvania as a whole. So in this respect the two cities are like most of the other large cities in the State, with the exception of Philadelphia where textile and textile products industries have a higher employment total.

The importance of the textile and textile products industries at York, and their relative insignificance at Johnstown, is in part a reflection of the general region in which each city occurs. In eastern Pennsylvania and northern New Jersey textile and textile products industries had an early start and are today widespread. The prominence of these industries in York is merely a reflection of similar conditions in Philadelphia, Lancaster, Reading, Allentown, and other nearby cities. On the other hand, the textile industries have not spread west of the Appalachians to any considerable extent. They are unimportant in Pittsburgh and they are unimportant in Johnstown, its satellite.

Coincident with the importance of textiles and textile products at York is the much larger percentage of women among the industrially employed of that city than of Johnstown. This helps to explain the remarkably high proportion of York's total population (about 22%) which is employed in manufacturing.

Industrial maps of Johnstown and York exhibit another striking contrast (Figures 11 and 12). Johnstown's plants are sharply confined to the valley bottoms, and hence the industrial map of that city shows three prongs of industrial development meeting at the center of the city. Most manufacturing plants derive at least some benefit from nearness to railroads, and the railroads are of necessity confined to the valleys. Moreover, zoning restrictions have prevented the manufacturing plants from developing in the better suburbs of the plateau surface.

The distribution map of York's manufacturing industries shows no such exact confinement; instead, the plants give the impression of being widely scattered over the city. The heavier industries which require rail transportation have had a wider choice of sites, since topography has not limited the paths of the railroads nearly as much as has been true in Johnstown. As a result there are five strips of manufacturing plants, corresponding to the courses by which the railroads leave the center of York. Moreover, the nature of many of the city's industries is such that they have not needed location on a railroad, and these industries are scattered widely over York, contributing to the impression of an even distribution of manufacturing plants.

JOHNSTOWN, A MINING CENTER

Though Johnstown is primarily a manufacturing city it is a coal mining center, too, the mining being closely related to Johnstown's primary iron

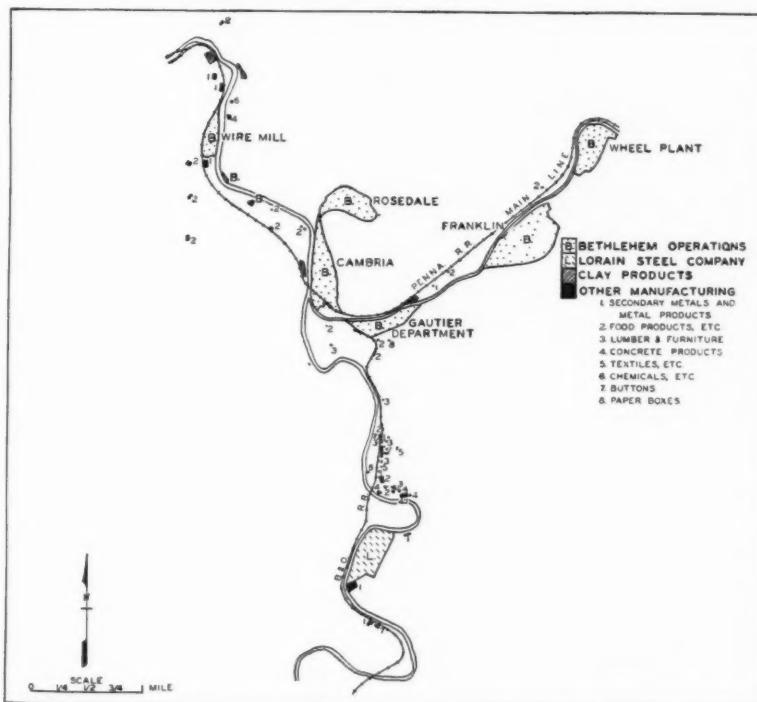


FIG. 11.—Location of principal types of manufacturing in Johnstown, 1932.

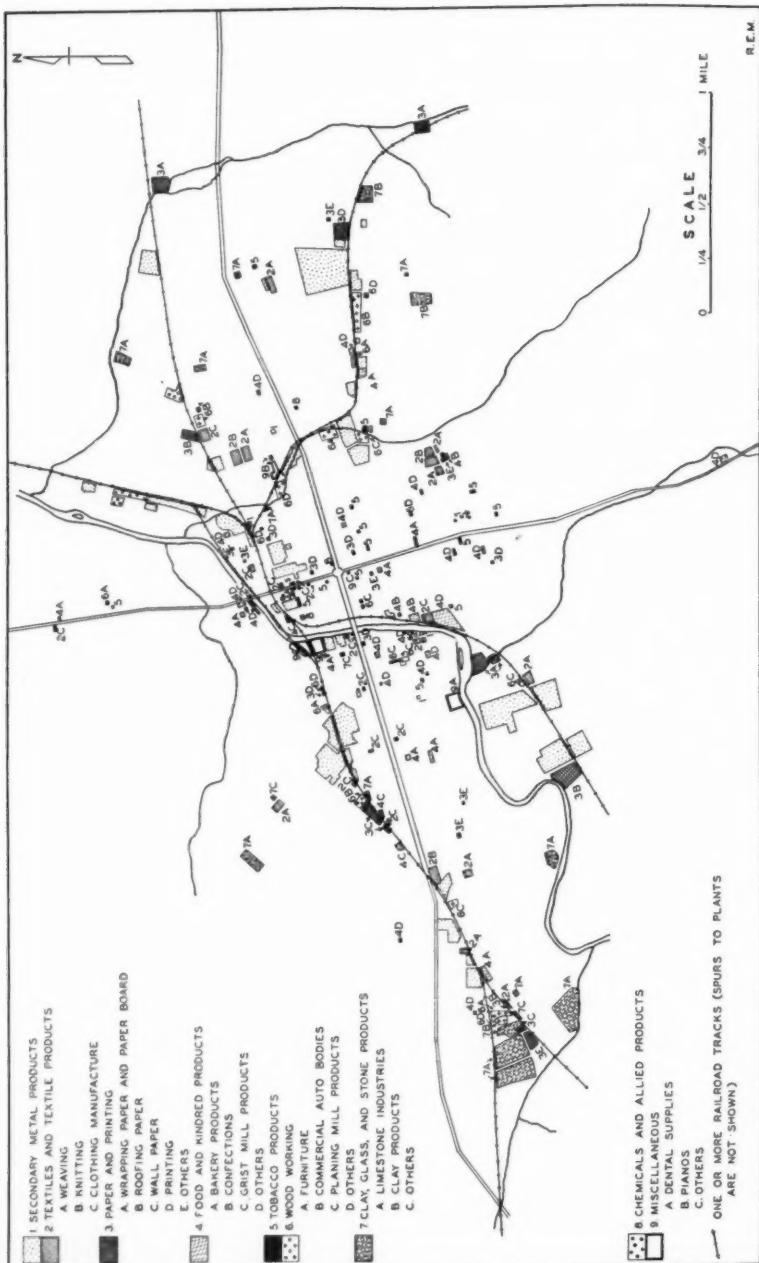


FIG. 12.—Location of principal types of manufacturing in York, 1934. (On a considerably larger scale than the corresponding map of Johnstown, Figure 11.)

and steel industry. Much of the coal is produced by the Bethlehem Steel Company for use in its plants; but a considerable quantity of coal mined near the city is shipped for sale to ordinary consumers. It is estimated that between 1000 and 2000 Johnstown residents are employed by coal mines, and the coal industry is undoubtedly of great importance to the city. A much less important mining enterprise is the digging of part of the clay used by Johnstown's refractory plants.

Mining at York, on the other hand, is represented only by the quarrying of limestone for use in lime and cement manufacture and as crushed stone, and by the digging of clay from pits for the brick plants. Less than 100 men are employed in this way, so mining means little to York, its only real importance being that it furnishes raw materials for manufacturing industries that employ about 4% of the city's manufacturing wage earners.

COMMERCIAL DIFFERENCES

A centrally located commercial core and outlying smaller areas of commercial development are elements of the picture of nearly every city. In their conformance to this general pattern Johnstown and York are commercially alike, but when they are examined in more detail differences become evident.

In view of the way in which Johnstown is crowded into valleys it is not surprising that its commercial core is more concentrated than that of York and has a more metropolitan aspect. There are taller buildings, two reaching twelve stories in contrast to nine for York's highest structure, and there is in general more of a "big city" air about the most highly developed part of Johnstown's commercial core (Figure 13). Flat land is restricted, and the core district at the stream junction is so much more advantageously located than any other part of the city that there seems to have been a tendency for everything to focus on that area. Originally, too, the eastern portion of Johnstown's commercial core area had the advantage of location on the canal basin which was the eastern terminus of the Western Branch of the Pennsylvania Canal, and this has tended to concentrate the greatest development upon a relatively small part of the flat at the stream junction (Figure 14; compare with Figure 2).

York's commercial core has developed where the Philadelphia-Pittsburgh road (now a link in the transcontinental Lincoln Highway) crosses the Harrisburg-Baltimore road to form Continental Square (Figure 15). Lacking serious topographic restrictions, commercial development has been able to spread readily from the road intersection, and has extended par-



FIG. 13.—Air view of the commercial core of Johnstown, looking northeast.
(Photograph by Frank Turgeon, Jr.)

ticularly toward the west, doubtless because of the early importance of the stream crossing (Figure 4). There has been less necessity for tall buildings than in Johnstown, since a considerable area has a location almost as good as that of the Square. Moreover, York is an older city, particularly so when it is remembered that most of Johnstown's core district had to be rebuilt after the flood of 1889, and most of the buildings surrounding York's central square were erected before skyscrapers had become common. It must be remembered, too, that the "Pennsylvania Dutch" people of this section have always displayed marked conservatism, and the erection of many-storied buildings in so small a city as York must have seemed to them a highly doubtful venture. Finally, there is the factor of chance. In spite of their inappropriateness one or more tall buildings might have been erected at York, as they have been in other cities just as old and equally unrestricted by topography.

The outlying commercial districts, too, differ in the two cities. Although there are outlying commercial areas in York—in North York, in West York, and on the main street about a mile east of the center of the city—yet they are distinctly minor, and seem designed merely to satisfy locally the most imperative needs of the people. Continental Square is so

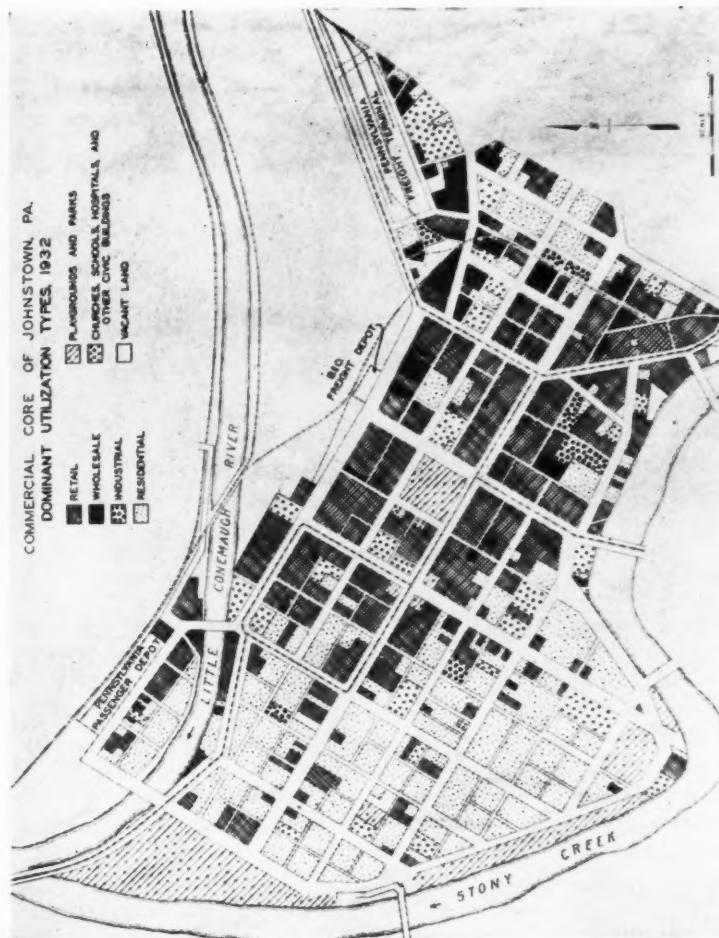


FIG. 14.—Dominant utilization types of Johnstown's commercial core. The lenticular area between the highly developed part of the core and Little Conemaugh River was the site of the old canal basin, the area now being occupied by the Gautier Department of the Bethlehem Steel Company. (Compare with Figure 13.)

easily reached from any part of the city that the importance of local commercial districts is distinctly limited.

In Johnstown, on the other hand, outlying commercial areas have assumed considerable importance. The geographic city has already been



Fig. 15.—Central York, looking south, showing the commercial core as it is today. Continental Square is almost exactly in the center of the picture. (Photograph by Clay Shannon, Photographer of York Flying Service, Inc.)

described as consisting to a large degree of a series of more or less distinct urban units. The upland boroughs, mostly by their own choice, have little commercial development; but the sections of the city strung out along the valley floors, corresponding to wide places in the valley, tend each to have a well-developed commercial area. Many of these semi-distinct pieces of city are made up largely of the homes of workers in an adjacent manufacturing plant, as is the case with East Conemaugh and Franklin. Possibly it is because of this community of interest and because of the difficulty of travelling the winding congested streets to the commercial core that the commercial areas of these localities are so well developed.

In the commercial functions of the two cities there is a further contrast. In addition to being an industrial city, York is an important trading center for a prosperous agricultural region. The plateau country around Johnstown is less hospitable to agriculture, and the city is less of an agricultural trading center, although it does have a considerable trade with small mining towns of the vicinity.

RESIDENTIAL ASPECTS

The fact that both Johnstown and York are industrial cities suggests that residentially they should be much alike, the designation "industrial city" conjuring up pictures of uniform rows of company houses and of

smoke-begrimed, dilapidated slums. Neither city conforms very closely to this character.

York exhibits striking uniformity of houses, it is true, but these houses were not built by manufacturing concerns for their employees; they resulted instead from private initiative. In distinction to most cities of the United States are the long rows of red brick houses under a single, continuous roof (Figure 16). In a number of cases these blocks of houses



FIG. 16.—Continuous blocks of houses, typical of the older sections of York.

are built without setback from the sidewalk, with occasional little wooden doorsteps, and sometimes with a projecting porch or balcony three or four feet above the walk level and guarded by a railing. But whether in uniform rows or standing out as individuals, whether with yards or without yards, brick is the dominant material. Only the newest, finest residential sections of the city have escaped this tyranny of brick and the monotony of continuous-house blocks.

Johnstown exhibits no such dominance of brick, nor is uniformity of house types common. Frame houses are much more prevalent than brick, particularly in Johnstown's most industrialized sections, and these same industrial areas show greater uniformity of architecture than is exhibited by any other part of the city. Still, even in those sections showing greatest uniformity the houses stand out as individuals and are not in a series under a continuous roof.

Both in the prominence of brick as a building material and in the prevalence of continuous houses York seems to have followed the lead of Philadelphia and Baltimore. The widespread use of brick in all of these cities was natural in view of the abundance of suitable clay for brick making and the early scarcity of timber in the region.

Unquestionably there was economy in building the continuous houses so characteristic of York as well as of its large seaboard neighbors. Their construction was not, as might be supposed, restricted to the very early

days of the city. Instead, most of these houses were built during the greatest period of city growth, the last half of the nineteenth century, some even dating from the beginning of the present century. There seems to have been a continued demand for cheap, substantial homes, and the continuous-house blocks answered that need.

The forests of the Appalachian Plateau were not early cleared away as were those of the Northern Piedmont, and lumber was much cheaper and more readily available for the building of Johnstown than for York. Brick materials there undoubtedly were, but the cheaper frame construction has dominated the city.

The only parts of Johnstown that show much uniformity of house types are the sections near some of the Bethlehem Steel Company's plants (Figure 8). This company, or its predecessor, at one time had the policy of building houses for rent to employees. The practice has long since been abandoned and the buildings have been sold to individuals, but naturally, for reasons of economy, houses built with such a purpose were likely to be of frame and of uniform type. They were not, however, built as continuous houses, a custom which never seems to have pervaded Johnstown, possibly because frame houses under a single roof would present too great a fire hazard.

Another contrast between residential Johnstown and residential York is in the matter of slums. Like many industrial cities Johnstown has its slum districts, areas of dilapidated, smoke-begrimed houses. The most marked occurrences are near the iron and steel mills, some of the very worst looking sections being the ones described as consisting of rows of uniform frame houses. In York, on the other hand, such smoke-stained, very low grade residential areas are generally lacking.

Probably the chief reason for this difference is that Johnstown's great industry, the making of iron and steel, creates much smoke and dirt; while York's industries have been described as using little coal. Doubtless, too, the dominance of brick houses has operated against the existence of slums in York, since brick houses do not show the effects of age or become weather-stained and dirt-stained as rapidly as do frame houses.

It has often been said that industrial cities in areas of prevailing westerly winds tend to have their finest residential sections on the west sides of the cities, where there is relative freedom from smoke and dirt. Johnstown, with a major industry creating much smoke, bears out this principle strikingly, its finest residential suburbs, Westmont and Southmont, lying on the plateau surface west or southwest of the center of the city (Figure 7). York's finest residential areas, on the other hand, are chiefly in the southern and eastern portions of the city. Of course, due to the nature of

York's industries, there has been little smoke and dirt to avoid, so a west side location has not been imperative, but there seem to have been other reasons, too, for the best residential development avoiding the western part of the city. Bed rock is close to the surface there, making the digging of foundations difficult; and, what is probably more important, a cement plant and a lime plant began operation in the western end of the city before the time of construction of York's finest houses, and their presence must have operated against high-grade residential development.

CONTRASTS IN DURABILITY

The most vital test of any city lies in its ability or inability to endure, to maintain itself when subjected to the trials of time and of depressed business conditions.

Johnstown suffered severely in the depression years following 1929. The iron and steel industry was operating at a minimum, and, since primary iron and steel manufacture normally employs two-thirds of the city's industrial wage earners, unemployment was rife and relief for the unoccupied workers became a serious problem. Business of all kinds was drastically curtailed in this "one-industry" city, and the city's banks were in trouble. Most serious of all were the rumors periodically arising that the Bethlehem Steel Corporation might abandon its Johnstown plants, since the industry no longer depends to any considerable extent upon local resources and since the market situation of the Johnstown unit is not a good one. Although it seems likely that the inertia of invested capital will operate against any such drastic change, yet the very fact that the rumors arise indicate the city's vulnerability. Of course, if the primary iron and steel industry should go, Johnstown would still have its smaller manufacturing plants and it would still be a coal mining center, but these activities could not maintain a city nearly as large as the present one.

York, on the other hand, was affected remarkably little by the depression years. A few minor factories shut down, it is true, but there were no major failures. Some plants decreased their payrolls, but nearly all of them continued to operate, while a few new factories opened, absorbing part of the excess labor. General business conditions were much above the country's average, as indicated by the continued operation of the city's ten banks.

The industrial diversity of York seems to have proved its worth. There was no great single industry which by ceasing operation could bring the whole city to a standstill. Moreover, since many of York's industries are secondary, they are not as quickly or completely affected by business declines as are such primary industries as the dominant one at Johnstown.

We might even say that Johnstown, possessing greater mineral wealth than York, has been encouraged by this asset to develop an industrial structure less stable than that of the Piedmont city. Still it is to be doubted whether Johnstown, if it had not acquired a primary iron and steel industry, could have achieved anything like the great industrial diversity of York, for after all the latter has a much superior location.

The Pennsylvania State College,

April, 1935.

A Study of Population Regions in New England on a New Basis

STANLEY D. DODGE

INTRODUCTION

The history of the United States reveals a restless people moving out to settle new frontiers and surging back to repopulate abandoned areas and to swell the numbers of urban residents in the older settlements. Since it may be taken as an axiom in the study of the cultural landscape that demographic changes induce cultural changes, it becomes desirable to study the flow and ebb of population as the basis of a fuller understanding of the associated alterations in the cultural landscape, and to show cartographically the quality of the varied changes in population, so that the areas affected may be delimited, in the rough at least. Furthermore, a cartographical analysis of the dates of critical changes in population numbers is desirable because rather large areas are usually affected simultaneously throughout. This suggests a single pivotal economic alteration, as when the increase of population in an area of timber cutting is accompanied by a corresponding increase in population in adjacent areas of lumber milling and paper manufacture.

The paragraphs which follow enlarge these ideas with respect to New England, and develop certain areas of demographic and consequently cultural change, in which the similarity of the behavior of the growth and decline of population, expressed as a curve, suggests identity of concurrent economic data. A method of delimiting, in a general way, regions of the cultural landscape, is developed from this study; and from a closer analysis of the population figures there is evolved a way of initiating the study of the evolution of that landscape.

ANALYTICAL METHODS IN THE STUDY OF POPULATION CHANGE

The possibilities of the classification of population units according to the character of their growth was first suggested indirectly by Brunhes.¹ He pointed out that the geographic study of cities should consider what stages have been reached in the processes of growth and decline. The natural vicissitudes of demographic and economic change make their results

¹ Brunhes, J., *La Géographie Humaine*, Paris, 1910, p. 15.

almost a natural law.² Every recent census has brought forth studies of the amount of growth or decline for particular areas during the preceding decade, and there have been a few noteworthy portrayals of the spread of population by decennial population maps.³ In the researches of Pearl, carried on over a long period of years, the data of numerous types of population as well as of growth in general have been analysed. His studies of growth, from colonies of flies, through increase in the weight and size of various animals, to the development of human population in several countries, yield substantially similar graphical results.⁴ As a consequence of the consideration of Pearl's analyses, it seemed probable that more worthwhile geographical ends might be served by statistical and distributional studies of the smallest possible units. In carrying out this idea, the population figures of Vermont and New Hampshire were examined, and subsequently the method was extended to the whole of New England.⁵ It is the results of this further study which are presented herewith.

First of all, it was necessary to collect and tabulate the data from the various volumes of the census, from the most recent (1930) back to the beginning. When townships appear in the census for the first time later than the earliest enumeration, the data were gathered, of course, only as far back as they were available. For townships, the origin of which antedates the beginning of the census, the earlier figures were taken from whatever sources possible, but there has been no success in extending reliable statistics back towards the dates of settlement with sufficiently regular intervals to give much validity to any graph that might be constructed from them. This, however, has not been taken as invalidating the data obtained from the census; it does, nevertheless, make impossible, for the present at least, the study of the distribution of the minor peaks of population occurring before 1790.

After the tabulation of the census figures, curves of population growth and decline were plotted (Fig. 1), and the resulting curves were compared

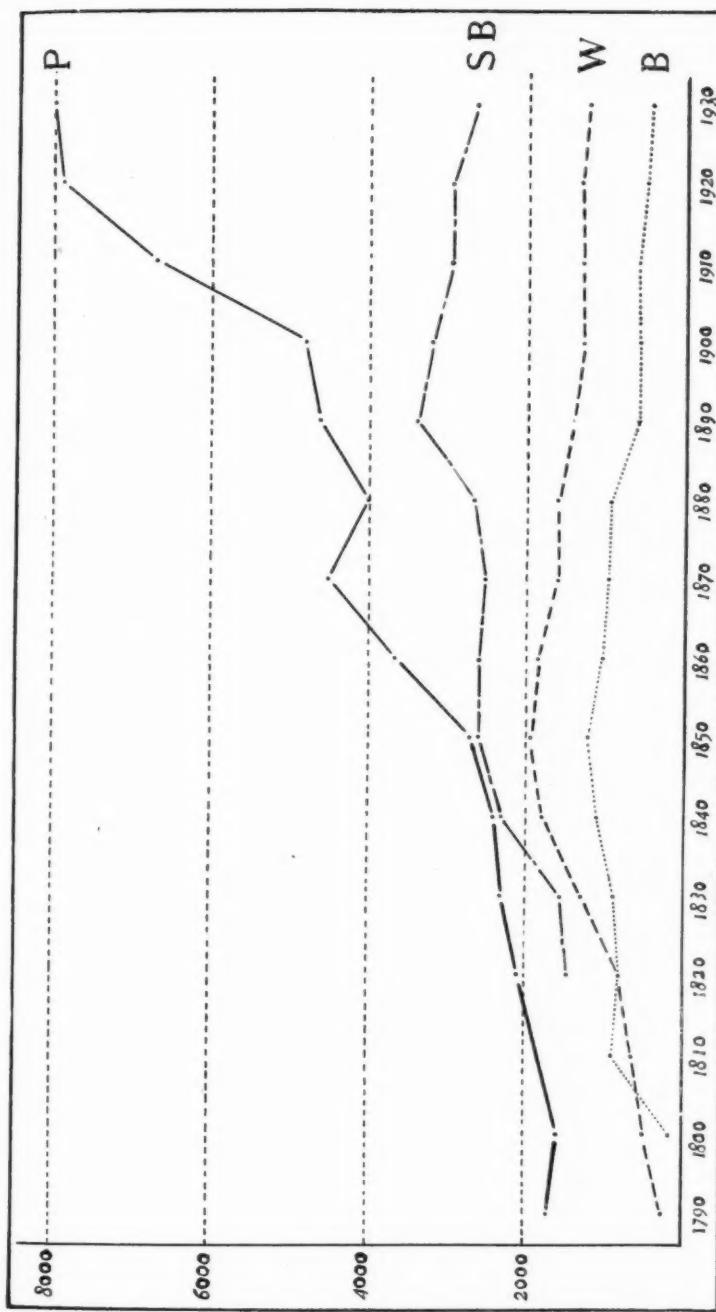
² Cf. Pirenne, H., *Medieval Cities*, Princeton, 1925, pp. 59-66.

³ Smith, G.-H., "The populating of Wisconsin," *Geog. Rev.*, 18, 1928, pp. 402-421; Jefferson, Mark, "Looking back at Malthus," *ibid.*, 15, 1925, pp. 177-189.

⁴ Pearl, R., *The biology of population growth*, New York, 1925, *passim*.

⁵ Dodge, S. D., "A study of the population of Vermont and New Hampshire," *Papers of the Michigan Academy of Science, Arts and Letters*, 18, 1932 (1933), pp. 131-136. In addition, a similar study was undertaken of the southern peninsula of Michigan. This was published in the *Papers of the Michigan Academy* for the year 1933 (1934), pp. 345-348.

FIG. 1.—Graphs constructed from Table I, showing the decade to decade changes in population for Plainfield, Connecticut (P), South Berwick, Maine (S B), Wentworth, New Hampshire (W), and Berkshire, Vermont (B).



with an ideal curve.⁶ Later, the amazing regularity of the rise and fall of population in the many townships already studied suggested a simpler comparative scheme. Five categories were established, as follows:

- A. Decade to decade increase
- B. Decrease from peak 1-25%
- C. Decrease from peak 25-50%
- D. Decrease from peak more than 50%
- E. Irregular, unclassifiable in above

A classification of towns directly from the tabulated figures thus became possible, from inspection and from the determination of what percentage the 1930 figure was of the highest figure at any previous census. This became the basis used throughout the study, the earlier method being abandoned.

TABLE I

Date	Plainfield, Connecticut	South Berwick, Maine	Berkshire, Vermont	Wentworth, New Hampshire
1790	1711	....	....	241
1800	1614	....	172	488
1810	1738	....	918	645
1820	2097	1475	831	807
1830	2289	1577	1308	924
1840	2383	2314	1818	1119
1850	2732	2592	1955	1197
1860	3665	2624	1890	1055
1870	4521	2510	1609	971
1880	4021	2677	1596	939
1890	4582	3434	1421	698
1900	4821	3188	1326	617
1910	6719	2935	1286	595
1920	7926	2955	1299	507
1930	8027	2650	1234	459
75% Peak	....	2575.5	1446.25	
50% Peak	....	....	617.0	598.5

Examples of each category of population. The figures in bold face type indicate the highest in each case. Percentages of the peak figure are given at the bottom for calculation of the proper category.

By way of illustration, four towns have been selected; population figures are recorded in tabular form (Table I) and graphically for reference

⁶ Dodge, S. D., *op. cit.*, p. 133.

and comparison (Fig. 1). The graph for Plainfield, Connecticut, shows a township that is still growing, or perhaps just at a peak; that for South Berwick, Maine, though there has been some decline, illustrates the condition of townships that have maintained population at or near a peak, with a decline of less than 25%; Berkshire, Vermont, shows a township which has declined more than 25%, but less than 50%; while Wentworth, New Hampshire, is the type of township in which decline is marked by a drop of population to less than half its highest figure.

POPULATION REGIONS OF NEW ENGLAND

The categories of population growth, outlined above, when distributed on a map (Fig. 2), show certain significant groupings. The southern part of Maine, much of New Hampshire and Vermont, and small portions of Massachusetts, Rhode Island, and Connecticut exhibit marked decline, and fall in the fourth group. In most instances these areas are mountainous or hilly, and all have severe winters.⁷ On the other hand, the greater part of the three southern states show not only maintenance of population, but also continued growth, especially in the Connecticut Valley, along the shore of Long Island Sound, and in the Boston-Providence area. Relative stability and partial decline (categories B and C) are found in northern Vermont and in a small part of northern New Hampshire. Northern Maine shows areas of continued growth contiguous to unsettled areas (E, in classification). Extreme southeastern Massachusetts is a second area of marked decline, adjacent to areas of maintained and growing population. The significance of population growth, in so far as it may be determined at present, may thus be discussed on a regional basis, and the following regions may be recognized: I. Northern Maine, II. Northern Vermont and New Hampshire, III. Southern Maine, New Hampshire and Vermont, and western Massachusetts and Connecticut, IV. Southern Connecticut Valley, eastern Massachusetts, and Rhode Island, and V. Cape Cod and the adjacent islands.

I. In northern Maine, chiefly in Aroostook County, a sequence of growing towns in the northern and eastern parts of the area seems to be associated definitely with the exploitation of forests in the parts of the county that have as yet no permanent inhabitants, and with the recent development of agriculture.⁸ The large uninhabited sections of Maine involve western Aroostook and northern Penobscot, Piscataquis, Somerset, Franklin, and

⁷ *Dfb* of Koeppen's classification. That climatic conditions are more than a contributing factor in the decline is rendered improbable by the fact that some portions of Maine, the climate of which is *Dfc*, show increasing population.

⁸ Wilson, Ella M., The Aroostook Valley, *Geog. Rev.*, 16, 1926, p. 196.

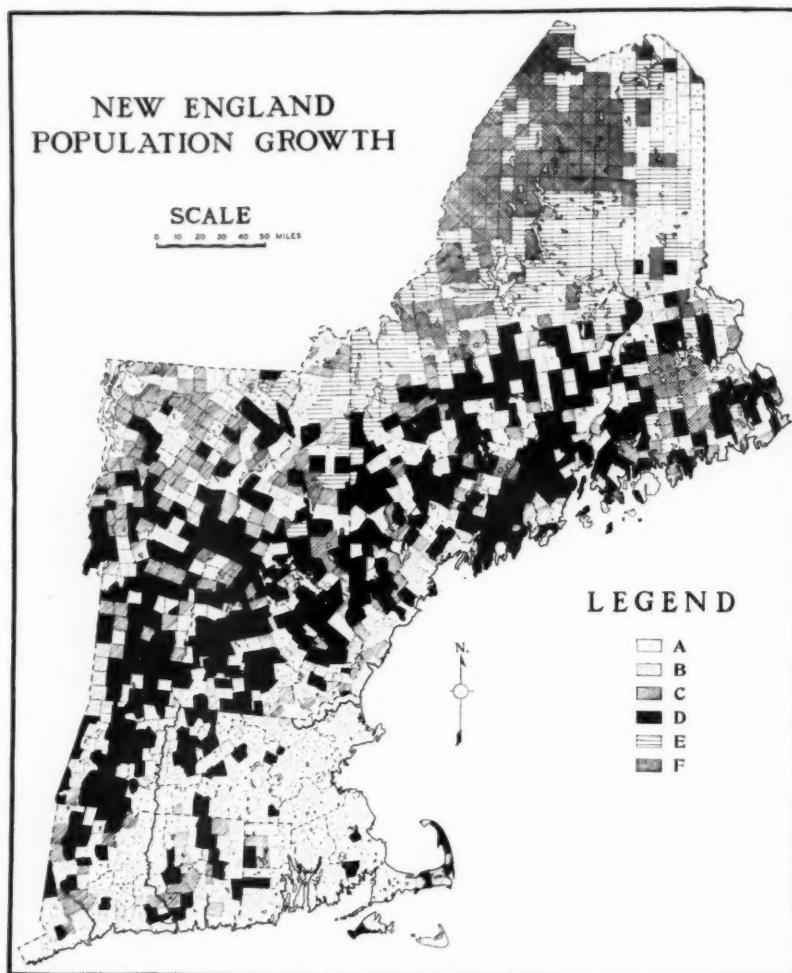


Fig. 2.—Categories of Population Growth and Decline for New England. A. No decline; B. Decline less than 25%; C. Decline between 25% and 50%; D. Decline more than 50%; E. Irregular growth (See Table II); F. No recorded data, at least at any recent census.

Oxford counties. Here there occur locally townships the fluctuating populations of which suggest an insecure agriculture or lumber camps in operation in some of the years of census taking. From this sparsely inhabited

area, timber is drawn to maintain a fringe of growing towns, the principal industries of which are saw-milling and paper-making, as at Groveton, New Hampshire, and Rumford, Maine.

II. Northern Vermont and adjacent areas in New Hampshire have maintained their population numbers or have suffered here and there but little decline, in contrast to the area just to the south, apparently because of the quarrying of granite, marble, and other rock minerals, such as talc, and because of the exploitation of the remaining forests. Of fundamental importance is the remarkable development of dairying for the supply of milk and other products to the growing New York and Boston Markets.⁹

III. The region of greatest areal importance in New England is the belt running from eastern Maine to western Vermont, Massachusetts, and Connecticut. This is the area of "towns that have gone down hill."¹⁰ Here the mountainside farming areas have been abandoned in part, and the population which remains has contracted itself within the narrower folds of an encroaching forest.¹¹ From these areas the population has been drawn off to the more promising agricultural lands of the Lake States and to the valley manufacturing towns of southern New England and their northern outposts.

IV. Southern New England has for the most part shown steady increases in population or at least has maintained the population of its numerous townships at or near a peak. The thriving towns of this area are supported by manufacturing plus a closely associated agriculture.

V. Cape Cod, Nantucket, and Martha's Vineyard, although they were able to support larger numbers of people in the heyday of their fishing and whaling prosperity, now maintain their diminishing numbers by a precarious dependence on an enthusiastic summer settlement.¹²

PEAKS OF POPULATION

In order to understand the significance of the foregoing it is necessary to place the rise and fall in the numbers of people against a background of

⁹ Whittlesey, D. S., "Coastland and interior mountain valley," in J. K. Wright's *New England's Prospect*, 1933, pp. 446-458.

¹⁰ Goldthwait, J. W., "A town that has gone down hill," *Geog. Rev.*, 17, 1927, pp. 527-552. This article outlines and applies a most fruitful method of study of the cultural landscape. The wider application of this method should yield results of great significance. See also Whittlesey, *op. cit.*, p. 453.

¹¹ Dodge, S. D., "The Vermont Valley: a chorographical study," *Papers of the Michigan Academy of Science, Arts and Letters*, 16, 1931 (1932), pp. 248-249.

¹² See the statement in S. E. Morison: *The Maritime History of Massachusetts*, p. 5.

the history of the area. The earliest settlements in and about Boston maintained themselves up to the latter part of the eighteenth century by varied combinations of agriculture, commerce, and the exploitation of furs, timber, and other natural resources.¹³ By the eighteen-twenties manufacturing had become important, and in the subsequent history of New England agriculture and the exploitation of the forests are linked rather to a domestic industry than to a foreign commerce.¹⁴ Somewhat before the rise of manufacturing in the south of New England, the conclusion of the French and Indian War in 1763 stimulated the migration of people from Massachusetts and Connecticut to northern New Hampshire and Vermont. At least it was from 1763 to the close of the century that rapid settlement took place towards Canada. The opening of the Lakes States agricultural areas in the early part of the nineteenth century drew westward many inhabitants of the newly settled upland of New England at the same time that factory development to the south was acting as a lure to others. Soon after settlement, then, depopulation began, except in a few interspersed areas. The various movements of these groups cannot be given in detail yet, but the general picture is about as has been sketched.

The distribution in New England of the dates at which the peaks of population were reached for the several townships shows also the spread of the dates of the incidence of decline. Analysis of the growth curves of the townships of New England made it possible to group them not only on the basis of the quality of growth and decline, but also on the basis of the date of maximum population numbers. Some of the towns reached peaks of population in the census year 1810, or before, whereas in others the peaks were delayed till late in the nineteenth or early in the twentieth century. When several or many contiguous townships show simultaneous culmination of population numbers, the presupposition may well be that a similar economic cause was acting throughout the area affected, and that, as a consequence, similar or related changes in the cultural landscape were taking place or had occurred. Figure 3 shows, within the limits of the census, the distribution of dates of population maxima. Two decades are grouped together in each category, because for any one census date the actual maximum of population may have occurred on any one of nine years before or after the decennial year as well as in the year of population enumeration. For the purposes of the map, therefore, the dates from 1790 to 1810 are grouped together; thereafter each category includes two census years, an even and an odd decade, through 1870. For the period 1880 to 1920 there is only one group, except that a decade by decade subdivision is made of

¹³ Weeden, Wm. B., *Social and economic history of New England, 1620-1789*, *passim*.

¹⁴ Adams, J. T., *New England in the Republic*, pp. 306-314.

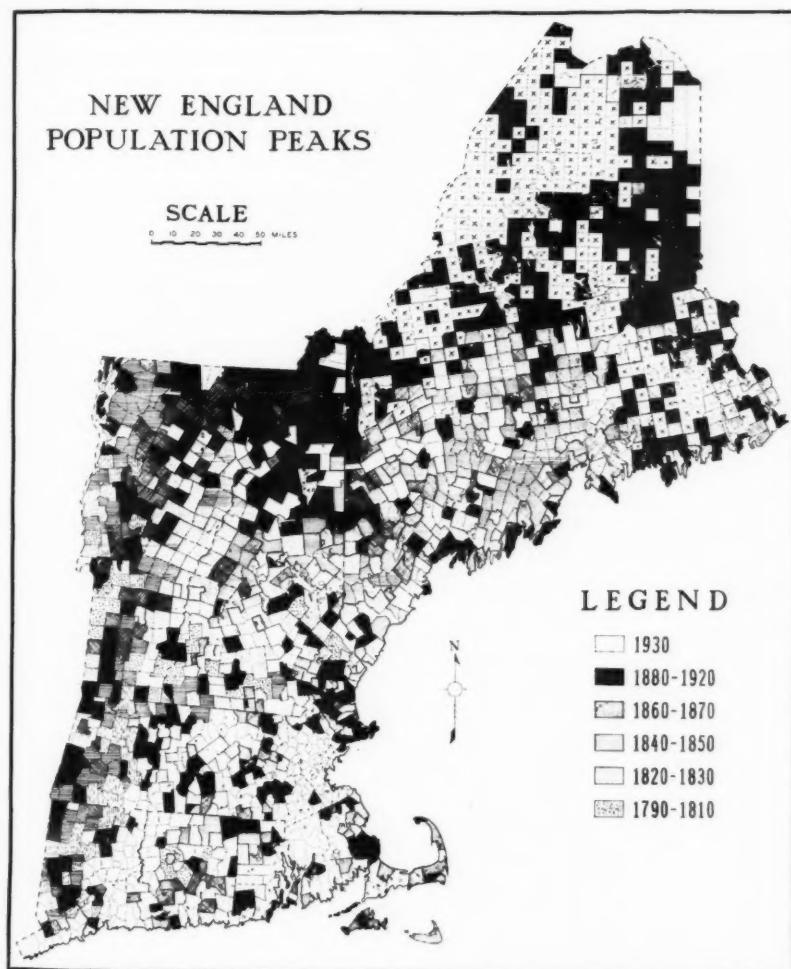


FIG. 3.—Distribution of dates at which peaks of population were reached in New England. The areas marked X have no recorded data, or the date was indeterminate; these areas correspond in part, therefore, to the distribution of categories E and F on the map of population growth and decline, Figure 2.

this group in a further analysis to be presented below. Towns which on the first map (Fig. 2) are counted as still growing, are in a category by themselves, obviously.

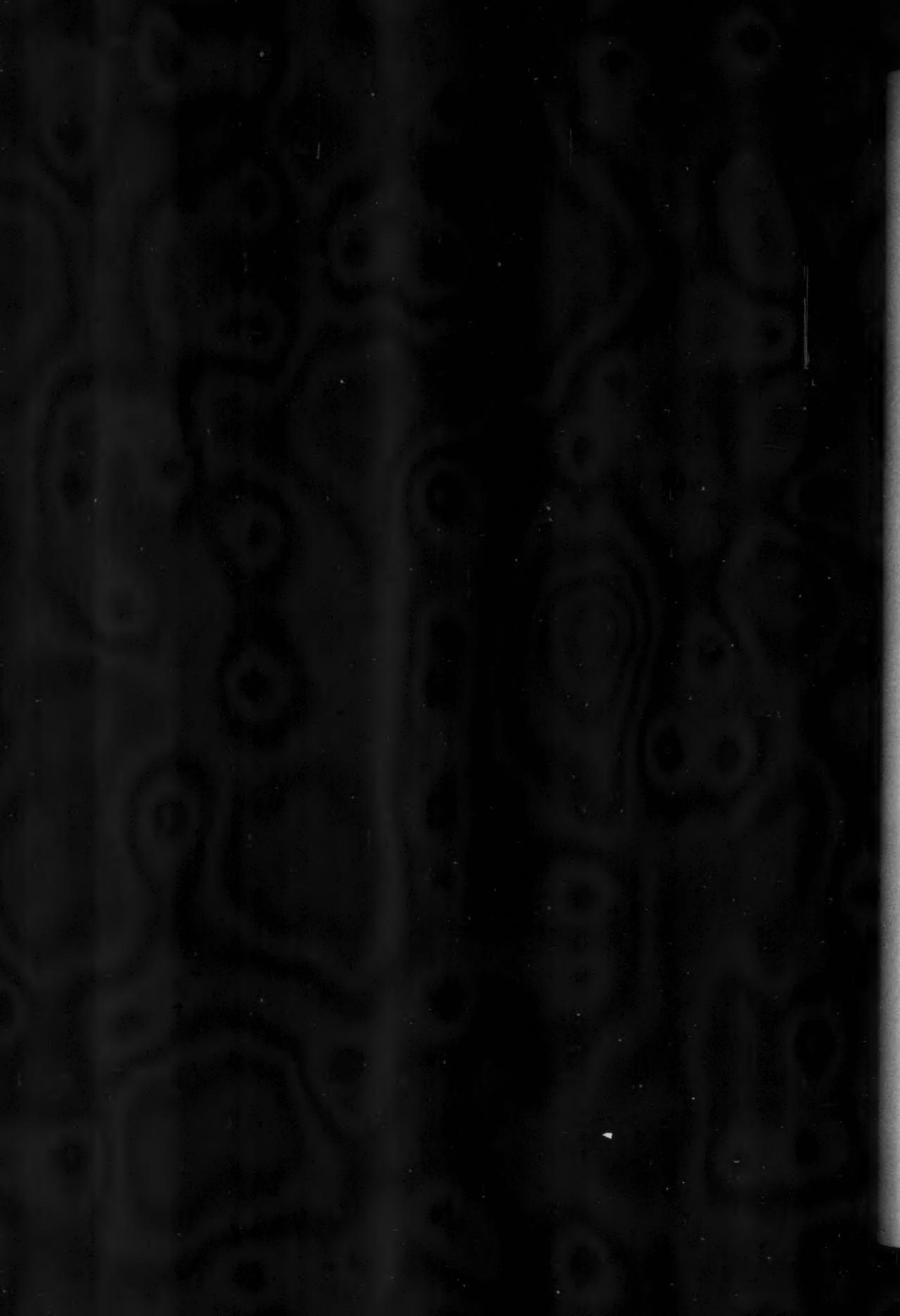
REVIVAL OF POPULATION

In the present discussion only those townships which reached peaks of population in the period 1880 to 1920 will be considered. It will be noted (Fig. 4) that townships of peak date 1880 are grouped in part in northern New Hampshire. This is the area of heavy timber cutting at that time, and lumbering may be considered the economic base of the growth that brought about peaks of population in that period. In considering the significance of this grouping in northern New Hampshire, it seemed reasonable to suppose that areas outside the region of timber cutting, but near it, might show some response to the economic stimulus.

In general the population curves of many townships show evidence of two cycles of growth (Fig. 4), and it was necessary to devise a method that would take care of these secondary peaks that upset the generally smooth curve that characterizes what may be called the normal cycle. In some of the cases where there is evidence of a second cycle, a maximum of inhabitants was achieved by the townships under the more or less self-sufficient agricultural system that prevailed prior to the introduction of factory industry.¹⁵ This is the first cycle. The development of factories in these, adjacent, or even remote areas induced further growth of population, the second cycle, which may or may not have reached a peak, subsequent relative stability, or decline. The two cycles cannot always be distinguished, first because the growth of townships was in some cases irregular, and secondly because the second cycle may be so imposed on the first that there appears to be no flattening of the curve indicating a period of lack of continued growth or of some decline in the first cycle; in cases of this kind, the peak was not reached under the agricultural system before the coming of industry. Nevertheless, in spite of the frequent indistinguishability of the two cycles, it remains true, in view of the history of New England, that both an "agricultural" and an "industrial" cycle must be present. In a few instances, noteworthy in Maine, settlement has taken place so late as to have had only the influence of the developed industry of the more southerly states. However, the development of special aspects of that industry resulted, over certain areas, in the stimulation of growth in towns on the decline, giving rise to a second cycle, or epicycle, of a somewhat special kind. The investigation of the distribution of townships showing evidence of a second cycle of growth demands that somewhat

¹⁵ See the case of Germany in Pearl, *op. cit.*, p. 21. It must not be assumed that the attainment of a peak of population means that the maximum possible density of population has been reached under the economic system prevailing. The problem of maximum density is too complex for so easy a solution. In very few New England areas have maximum possible figures been reached before the incidence of decline.





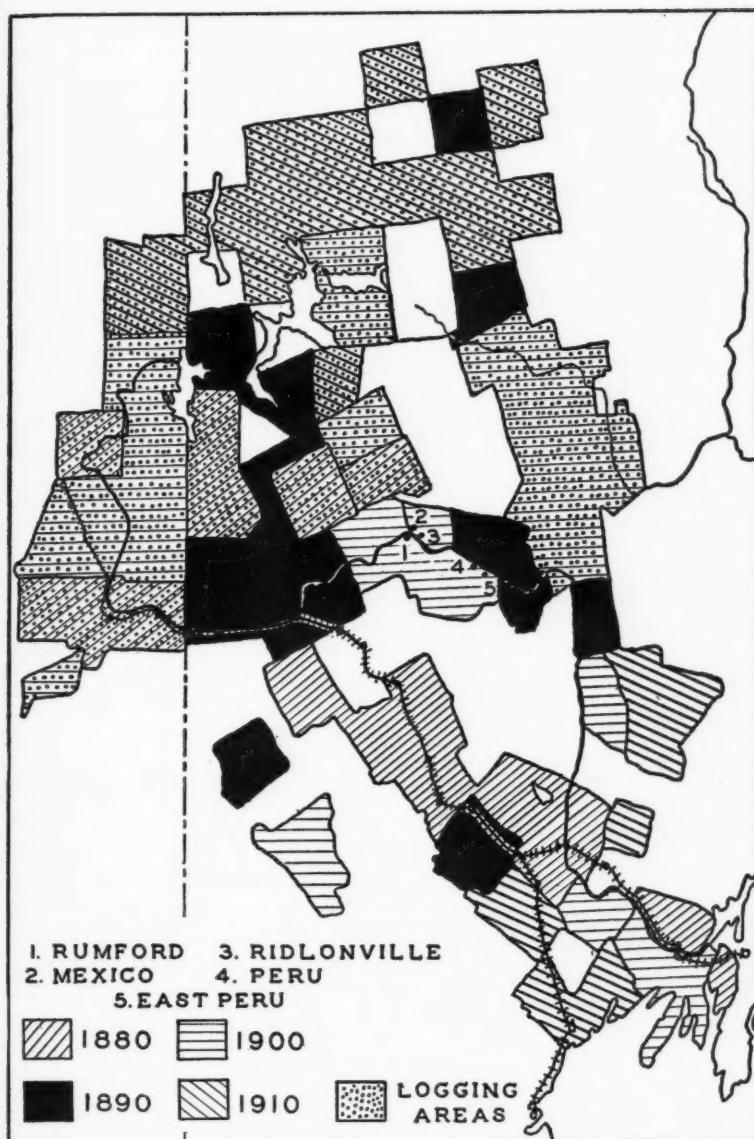


FIG. 4.—Parts of northwestern Maine and northern New Hampshire, showing the distribution of peaks of population or of revival of population growth, decade by decade for the years 1880 to 1910.

closer attention be paid to the population curves to detect those often seemingly minor fluctuations in the growth and decline of the numbers of people.

To test the theory of response to economic stimuli emanating from northern New Hampshire or revival of population which might be related to the peaks in that area, the population curves of the western part of Maine were reexamined for evidence of some irregularity in the curves, (1) an upward turn after a period of decline or (2) a sudden rise in population after a period of steady, but slow, increase. Table II gives the data for

TABLE II

Date	Rumford, Maine	Stetson, Maine	Crockertown, Maine
1800	262	....	....
1810	629	....	....
1820	871	....	....
1830	1126	....	....
1840	1444	....	....
1850	1375	....	....
1860	1375	....	8
1870	1212	....	9
1880	1006	....	2
1890	898	....	9
1900	3770	....	35
1910	6777	8	46
1920	8576	133	18
1930	10340	31	10

Rumford, Maine, shows the sudden increase accompanying the lumbering in adjacent areas. Stetson and Crockertown are typical of the irregular category of population growth (E). The highest figures in these two cases represent peaks of lumbering activity.

Rumford, Maine, which is an example. Areas of fluctuation and unstable population are numerous in northern Maine, and occur likewise in the northern part of New Hampshire. The population data for two townships of this type are also shown in Table II. They were classified according to dates by the highest figure. Thus, Stetson, in Franklin County, Maine, has 1920 for the date class, whereas for Crockertown, in the same county, it is 1910. These towns were in most cases areas of timber cutting, and are so classified on the map (Fig. 4). Areas left blank were unaffected throughout the period 1880 to 1920 so far as their population curves show.

The distribution of these classes of townships in western Maine is shown by dates, together with the adjacent area of towns in New Hampshire

which reached peaks in the same period (Fig. 4). It is found that the first revival of towns, that of 1880, is along the railroad leading from the timber cutting areas to Portland. This is probably related to the export of saw-logs from northern New Hampshire. The change which occurred in 1890, accompanied by some expansion of logging northward in western Maine, is much less definite in its distribution. In 1900, the revival is distributed with some exactness along the Androscoggin River, with an expansion of the logging area chiefly in the upper part of that river valley in New Hampshire, except for an area along the Sandy River tributary of the Kennebec. Here, however, only a small portion is probably connected with the growth of towns in the valley of the Androscoggin; the greater part is linked with contemporary developments in the Kennebec Valley. The stimulus to population of the date 1910 merely emphasizes the distribution of the 1900 revival, but it is accompanied by a greatly expanded area of cutting in Maine, north of the Rangeley Lakes, and in New Hampshire along a northern tributary of the Androscoggin. The concentration along this river in the later period is attributable to the fact that there was a change from the production of logs to the production of pulp-wood bolts. The former were preferably taken out by rail; the latter could be floated out by stream.

The forested area of northern New Hampshire and Maine was undergoing marked landscape change in the periods and for the areas indicated on the map (Fig. 4). The towns downstream and along the railroad were likewise experiencing landscape change of a different, but economically related, character. Herein lies the geographic justification of a demographic study like this, for by this means it has been possible to lay out a region in which an economic change with concomitant cultural landscape and population changes has given character to a large portion of the New England area. The investigation when spread over practically all of Maine shows similar results, except for large parts of Waldo and Lincoln counties, which were apparently but little affected by the economic revival of the latter part of the nineteenth century, and which have continued in their decline throughout. It is not intended to assert that the growth and revival were cause and effect, but merely to show that peaks of population in one area were accompanied by revival of population in another. The economic stimulus may have proceeded upstream as well as down, or it may, originating elsewhere, have affected both areas simultaneously.

CONCLUSION

In the foregoing paragraphs, the grouping of the various categories of population growth has been shown in terms of percentages of decline.

Grouping of peaks of population developed another class of regions made up of contiguous townships with identical peak. It was assumed that this identity of date of the culmination of population over a wide area might be the consequence of an identity of economic factors affecting it. On this basis, a further analysis of the population data of western Maine showed that certain towns there, along the railroad and along the Androscoggin River had, indeed, a significant difference of distribution according to date. This method makes it possible to lay out, tentatively and roughly, various areas of the cultural landscape which constitute important regions in the chorography of New England.

*University of Michigan,
April, 1935.*

Dissertations in Geography Accepted by Universities in the United States for the Degree of Ph.D. as of May, 1935

Many dissertations accepted by American Universities for the Ph.D. degree remain unpublished, others are printed, but piecemeal in several periodicals, and still others have appeared in publications of restricted circulation. Although in recent years a few universities have at intervals issued abstracts of their theses, titles on geography are mixed with the rest, and the earlier ones are omitted.

The number of dissertations in geography has grown rapidly during the past two decades, from a stray one or two a year to a dozen or more. The day may already have arrived when some student is unwittingly embarking upon a topic which has already been studied by another.

To survey the work that has been done, and to facilitate the use of theses already completed but not listed in the standard bibliographies, the Council has directed the compilation of a complete list of geographic dissertations accepted by universities in the United States. The editor here seizes the opportunity to thank those who furnished him with data for their several universities—data which have made possible the bibliography.

The list can not hope to satisfy all the tastes represented by the Association's membership. So broad a field as geography is not sharply bounded; therefore some theses may have been included which should have been omitted, and *vice versa*. Since no cataloging in the librarian's sense has been possible, the choice of items has been made perforce from the titles alone. Selection was most difficult in the border fields of geomorphology and economic geography. An attempt has been made to include geomorphic studies which emphasize what W. M. Davis would have defined as "geographic," and to exclude those more prevailingly geologic. But since most dissertations in geomorphology have been presented to departments of geology rather than geography, the assumed line of demarcation is perhaps mythical. In contrast, theses on economic geography are nearly always presented to and approved by departments of geography, although there are some exceptions.

An even more striking inequality appears in the case of ecology and meteorology although it concerns very few theses. Only one or two dissertations on plant geography are listed, since most ecologists are trained as botanists or as zoologists by departments of biology, a well established

subject which doubtless keeps track of its own bibliography. Conversely, since meteorology is generally under the wing of geography, all meteorological, as well as climatological dissertations are included.

Some dissertations must have been published, either in whole or in part, without the knowledge of the departments which originally accepted them. Since nearly all the information for making up the bibliography came from the departments, notation of such publication may be inadvertently omitted.

Because dissertations in geography are likely to deal with specific areas, they are here classified by regions. Within each minor region (indicated by center headings in italics), titles are arranged by countries (States within the United States), by parts thereof, and finally alphabetically by authors. The few titles which could not be classified regionally are at the end of the list.

THE EARTH AS A WHOLE

Bauer, Hubert Anton: "The Tide as an Environmental Factor in Geography."

University of Washington, 1930.

Ms. in Univ. of Washington Library, Seattle.

Finch, V. C.: "Geography of the World's Agriculture" (in collaboration with O. E. Baker).

University of Wisconsin, 1916.

Ms. in Library of Univ. of Wisconsin, Madison.

Published by U. S. Department of Agriculture, Washington, 1917.

Huntington, Ellsworth: "Changes of Climate of Recent Geological Time."

Yale University, 1909.

Ms. in Yale Univ. Library, New Haven, Conn.

Published by Houghton Mifflin, Boston, 1907.

Smith, Joseph Russell: "The Organization of Ocean Commerce."

University of Pennsylvania, 1903.

Ms. in Univ. of Pennsylvania Library, Philadelphia.

Published in *University of Pennsylvania Publications, Series in Political Economy and Public Law, No. XVII.* 1905, 155 pp.

(Some of this material is embodied in chapters of "*Industrial and Commercial Geography*," New York, Holt, 1913.)

THE EARTH IN ITS LARGER PARTS

Cruz, Cornelio C.: "Commercial Relations of the Philippine Islands with Other Regions."

University of Chicago, 1928.

Ms. in Harper Library, Univ. of Chicago, Ill.

- Abstract published in *Abstracts of Theses, Univ. of Chicago, Science Series*, 7 (1928-29), 251-257.
- Frey, John W.: "The Geographical Background of the Export Coal Trade of the U. S. and the United Kingdom." University of Wisconsin, 1926. Ms. in Univ. of Wisconsin Library, Madison.
- Polspoel, Lambert G.: "The Trade in Pork and Pork Products from the United States to Northwest Europe." University of Chicago, 1926. Ms. in Harper Library, Univ. of Chicago, Ill.
- Abstract published in *Abstracts of Theses, Univ. of Chicago, Science Series*, 5 (1926-27), 331-338.
- Renner, George Thomas: "Primitive Religion in the Tropical Forests, a Study in Social Geography." Columbia University, 1927. Ms. in Columbia Univ. Library, New York.
- Published by the author; Philadelphia, John C. Winston, 1927.
- Rich, John Lyon: "Studies in the Physiography of Semi-arid Regions." Cornell University, 1911. Ms. in Cornell Univ. Library, Ithaca, N. Y.

THE UNITED STATES

- Fassig, O. L.: "Types of March Weather in the U. S., With Special Reference to the Middle U. S." The Johns Hopkins University, 1899. Ms. in the Johns Hopkins Library, Baltimore, Md.
- Goode, John Paul: "The Influence of Physiographic Factors upon the Occupations and Economic Development in the United States." University of Pennsylvania, 1901. Whereabouts of Ms. unknown.
- Hubbard, George David: "Gold and Silver Mining as a Geographic Factor in the Development of the United States." Cornell University, 1905. Ms. in Cornell Univ. Library, Ithaca, N. Y.
- Johnson, Emory Richard: "Inland Waterways: Their Relation to Transportation." University of Pennsylvania, 1893. Ms. in Univ. of Pennsylvania Library, Philadelphia. Published in *Annals of the American Academy of Political and Social Science, Supplement to Vol. 4*, September, 1893; 164 pp.
- Wolfanger, Louis Albert: "The Major Soil Divisions of the United States:

A Pedologic-geographic Survey."

Columbia University, 1930.

Ms. in Columbia Univ. Library, New York.

New York, published by the author, 1929.

Brooks, Charles Franklin: "The Snowfall of the Eastern United States." Harvard University, 1914.

Ms. at Widener Library, Harvard University, Cambridge, Mass.

Parts rewritten, published as "The Distribution of Snowfall in Cyclones the Eastern United States," *Monthly Weather Review*, 42 (1914), 318-330; "The Snowfall of the Eastern United States," *ibid.*, 43 (1915), 2-11.*New England*

Burg, J. Herbert: "The New England Cotton Textile Industry—A Study in Industrial Geography."

Clark University, 1930.

Ms. in Clark University Library, Worcester, Mass.

Published as *The New England Cotton Textile Industry*; Waverly Press, Baltimore, 1932.Abstract published in *Clark University Thesis Abstracts*, 2 (1930), 7-11.Extract published as "Geographical Location as a Control in the New England Cotton Manufacturing Industry," *Transactions of the Illinois State Academy of Science*, 24 (1931), 434-439.

Jackson, Eric P.: "The Early Geography of the Champlain Lowland." University of Chicago, 1929.

Ms. in Harper Library, Univ. of Chicago, Ill.

Abstract published in *Abstracts of Theses, Univ. of Chicago, Science Series*, 7 (1928-29), 259-267.

Raisz, Erwin Josephus: "The Scenery of Mt. Desert Island: its origin and development."

Columbia University, 1929.

Ms. in Columbia Univ. Library, New York.

Published by New York Academy of Sciences, 1929.

Torbert, Edward N.: "The Evolution of Land Utilization in Lebanon, New Hampshire."

University of Chicago, 1931.

Ms. in Harper Library, Univ. of Chicago, Ill.

Published in abridged form in *Geographical Review* 25 (1935), 209-230.

- Keir, Robert Malcolm: "Some Influences of Environment in Massachusetts."
University of Pennsylvania, 1917.
Ms. in Univ. of Pennsylvania Library, Philadelphia.
Published in and reprinted from *The Bulletin of the Geographical Society of Philadelphia*, 15 (1917), 121-185.
- Botts, Adelbert K.: "Geographical Aspects of Water Power Development on the Deerfield River System."
Clark University, 1934.
Ms. in Clark University Library, Worcester, Mass.
Abstract published in *Clark University Thesis Abstracts*, 6 (1935).
Extracts published as "Water Power Development on the Deerfield River," 11 (1935), 148-158; "New England Water Power, Some Facts and Traditions," accepted for publication in *Journal of Geography*.
- Brown, Ralph H.: "The Economic Geography of the Middle Connecticut Valley."
University of Wisconsin, 1925.
Ms. in Library of Univ. of Wisconsin, Madison.
- Clune, Mary C.: "The Geographic Factors in the Development of the Massachusetts Towns of the Connecticut Valley."
Clark University, 1922.
Ms. in Clark University Library, Worcester, Mass.
- Klimm, Lester E.: "The Relation between Certain Population Changes and the Physical Environment in Hampden, Hampshire and Franklin Counties, Massachusetts, 1790-1925."
University of Pennsylvania, 1930.
Ms. in Univ. of Pennsylvania Library, Philadelphia.
Lancaster, Pa., published by the author, 1933.
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